

MD1811 DEMO BOARD TEST REPORT

Date: 2014.08.20

Author: Mix-Design Application Dept.

Power supply specification

Description	Symbol	Min	Typ	Max	Units	Comment/Condition
Input						
Voltage	V_{in}	90		264	V	2 Wire(L,N)-NO PE
Frequency	F	63		47	Hz	
Standby power				<150	mW	Open Load
Output						
Rating Output Voltage	V_{out}	4.75	5	5.25	V	
Rating load	I_{out}		1.5A		A	
Output Ripple&Noise				<200	mV	See Test Detail
Dynamic load		4.5		5.5	V	See Test Detail
Protection Function Item						
OCP				<1.8	A	
OVP				<6	V	
OTP						
OSP						

Feature

1. High efficiency Meet Energy star V2.0 level 5
2. No-load consumption less than 100 mW
3. SOIC-7 Package (PWM + Power Transistor all in ONE)
4. (PSR)Tight tolerance CV/CC operation without opto-coupler

DEMO Picture:

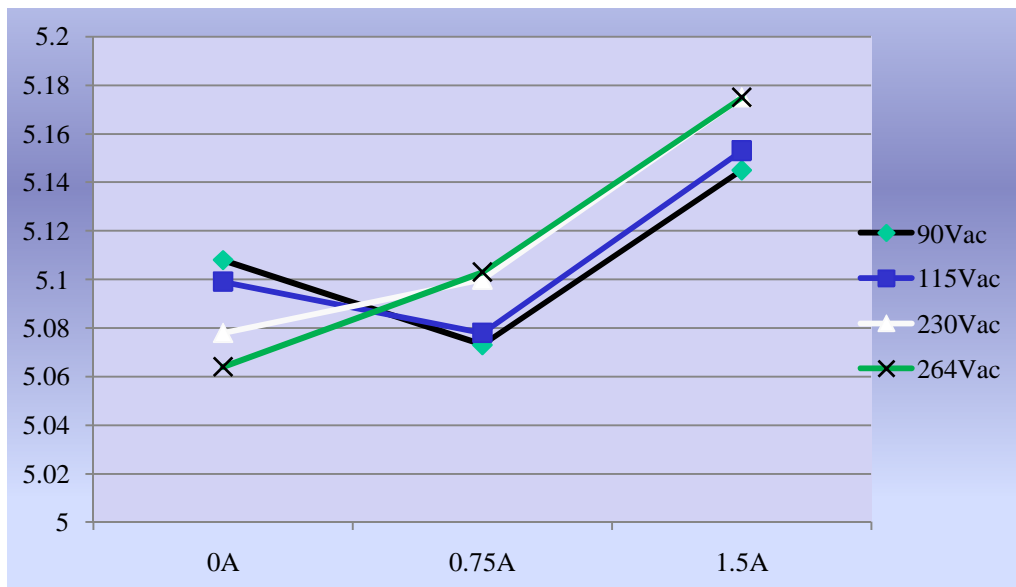


1. Output voltage regulation test:

1-1. CC mode:

V _{out} \ I _{out}	Input Voltage			
	90V _{ac}	115V _{ac}	230V _{ac}	264V _{ac}
0A	5.108V	5.099V	5.078V	5.064V
0.75A	5.073V	5.078V	5.100V	5.103V
1.5A	5.145V	5.143V	5.175	5.175V

1-2. CC Mode Data Curve:



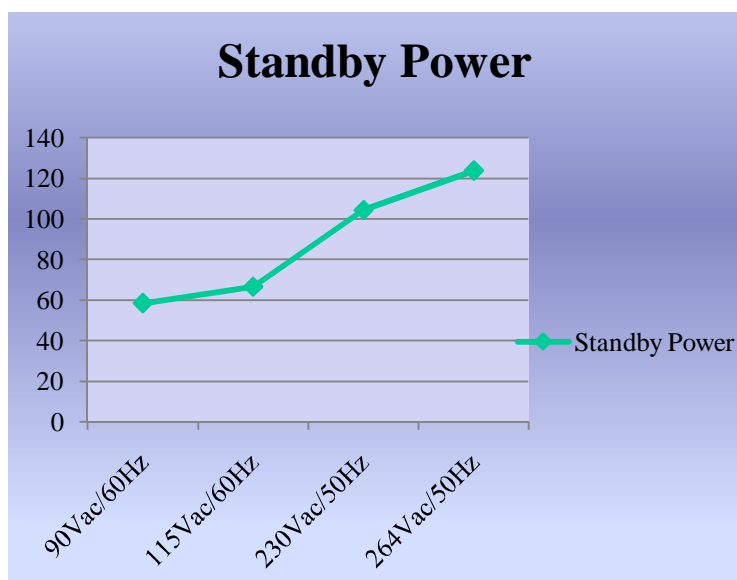
Note :The Test Above At The End Of PCB

2. Standby power and efficiency test:

2-1. Standby power test:

Input voltage	Input wattage(mW)	Specification	Test result
90V _{ac} /60Hz	58.5	<100mW	PASS
115V _{ac} /60Hz	66.5	<100mW	PASS
230V _{ac} /50Hz	104.3	<100mW	PASS
264V _{ac} /50Hz	123.7	<100mW	PASS

2-2. Standby power Data Curve:

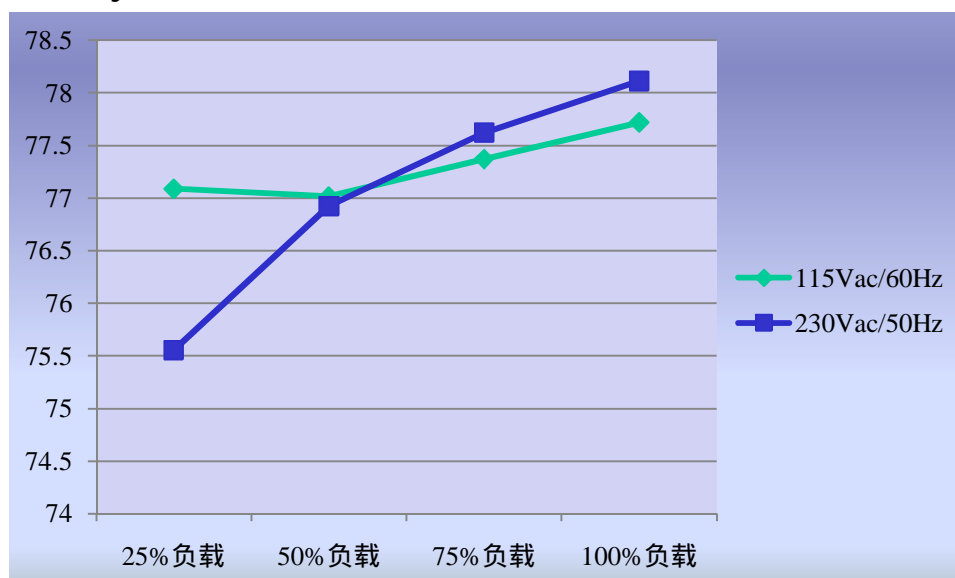


3. Standby power and efficiency test:

3-1. Efficiency test:

Input voltage	Load	I _{out} (A)	V _{out} (V)	Output wattage(W)	Input wattage(W)	Efficiency(%)	Average Efficiency(%)
115V _{ac} /60Hz	25%	0.375A	5.018	1.8817	2.441	77.089	77.299
	50%	0.75A	5.080	3.8100	4.947	77.016	
	75%	1.125	5.101	5.7386	7.417	77.371	
	100%	1.5A	5.145	7.7175	9.930	77.719	
230V _{ac} /50Hz	25%	0.375A	5.035	1.8881	2.499	75.555	77.053
	50%	0.75A	5.121	3.8408	4.993	76.924	
	75%	1.125	5.152	5.7960	7.467	77.622	
	100%	1.5A	5.197	7.7955	9.980	78.112	

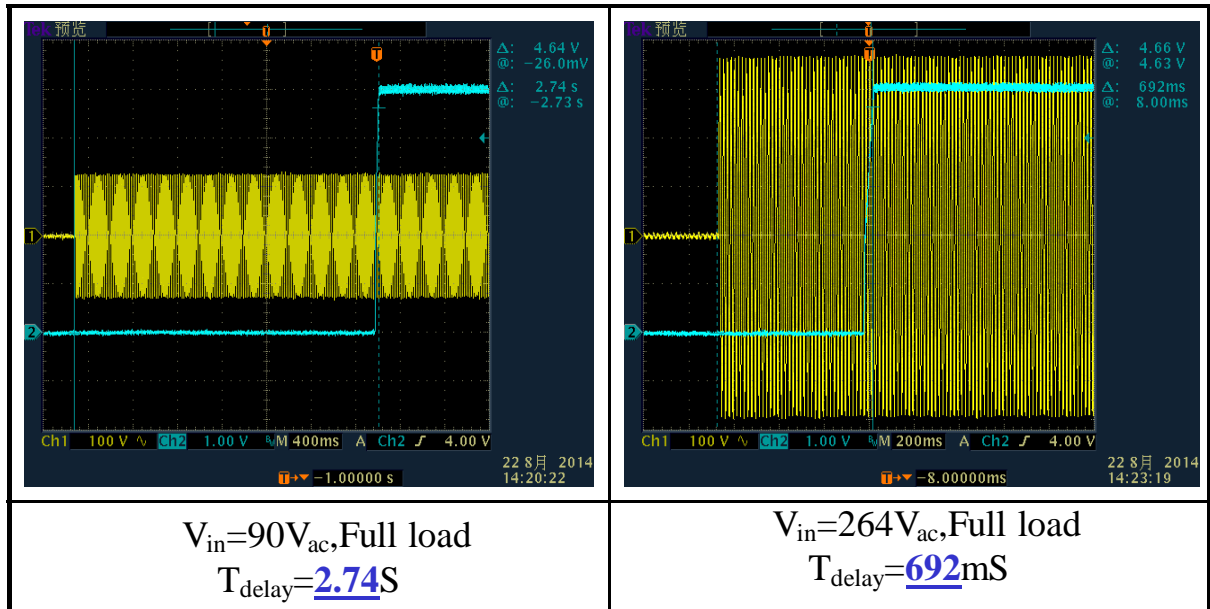
3-2. Efficiency Data Curve:



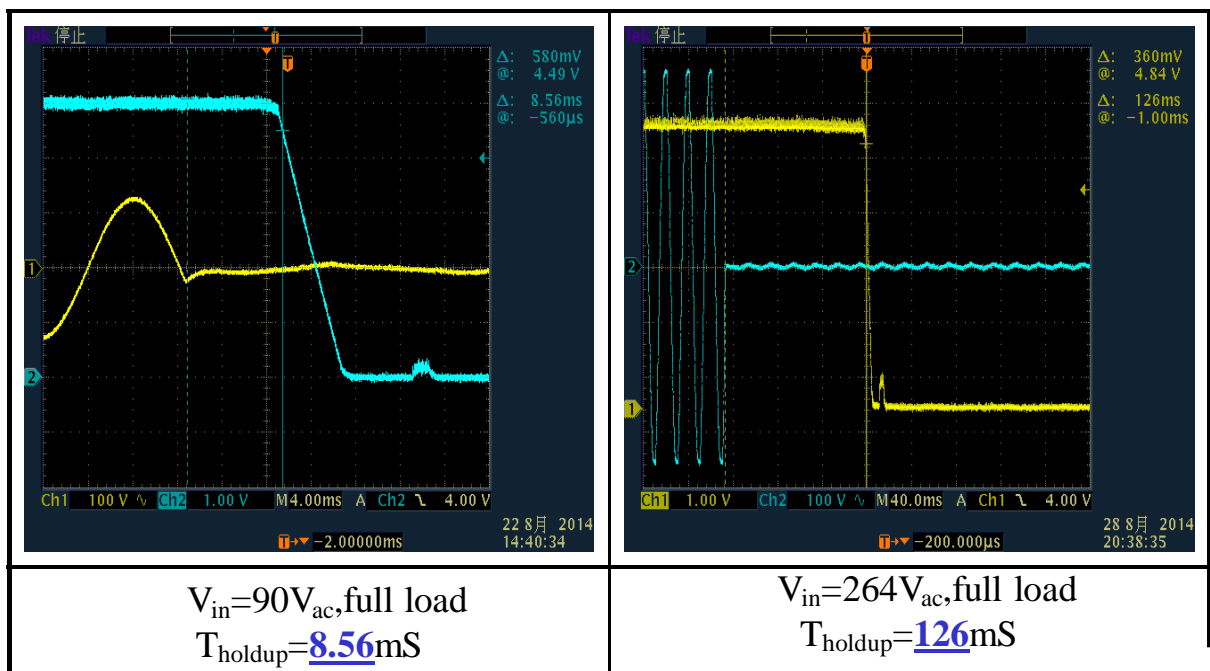
Note :The Test Above At The End Of PCB

4. Time sequence test:

4-1. Start up delay time:

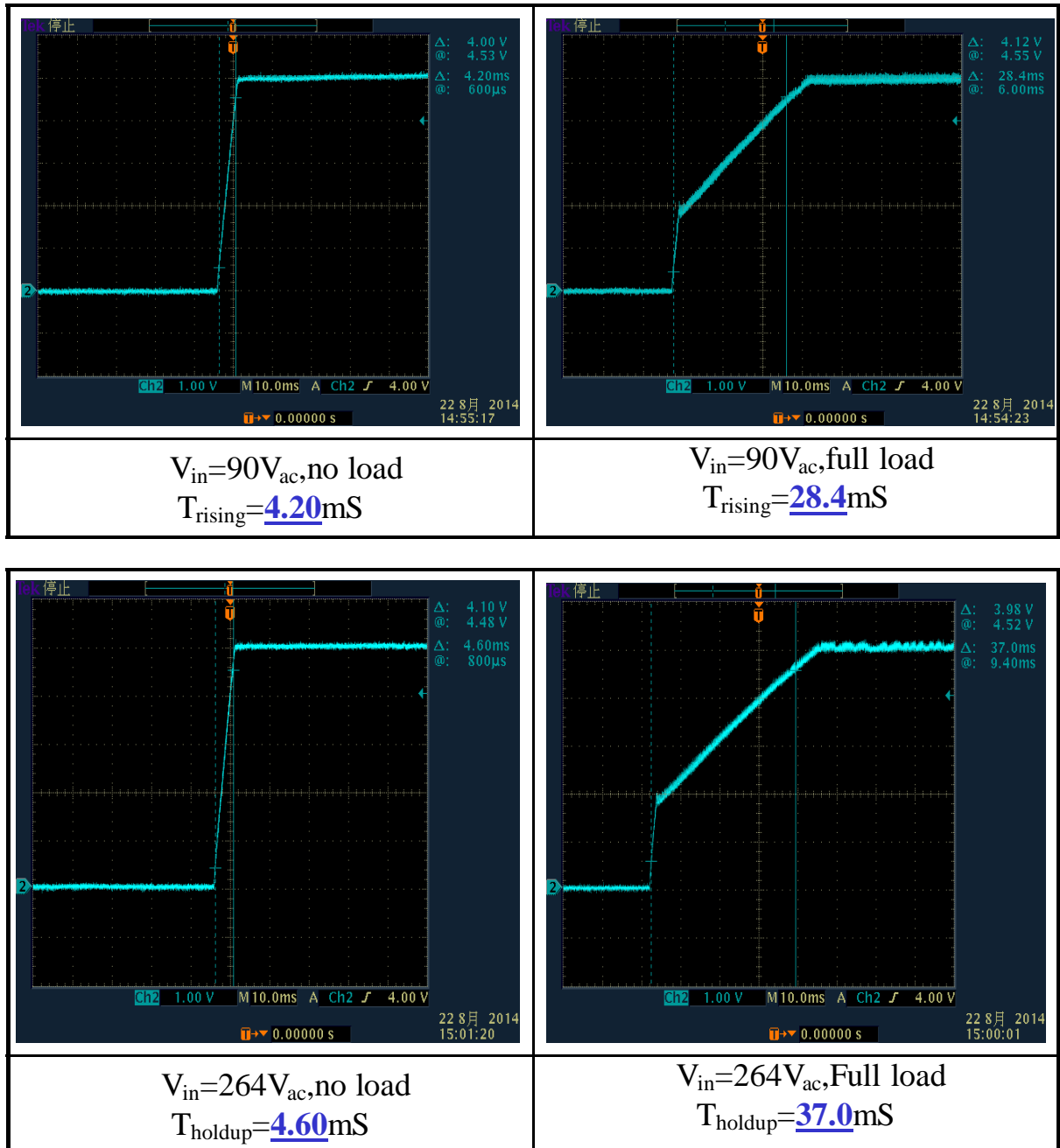


4-2. Turn off hold up time:



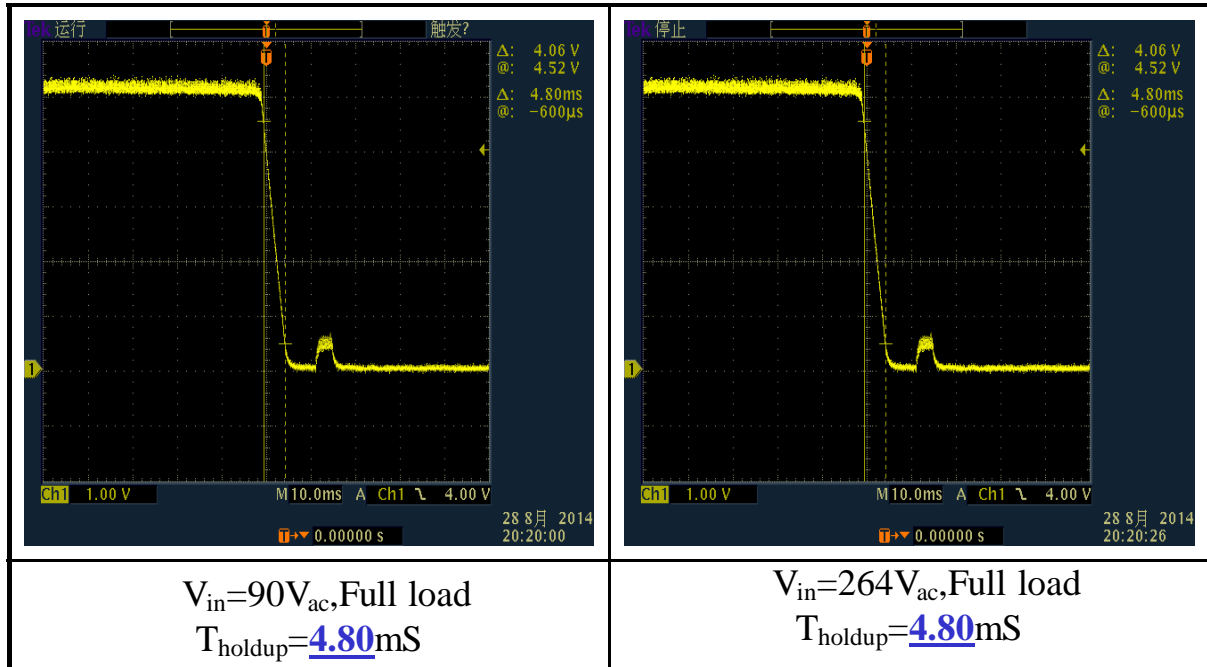
4. Time sequence test:

4-3. Rising time at turn on:

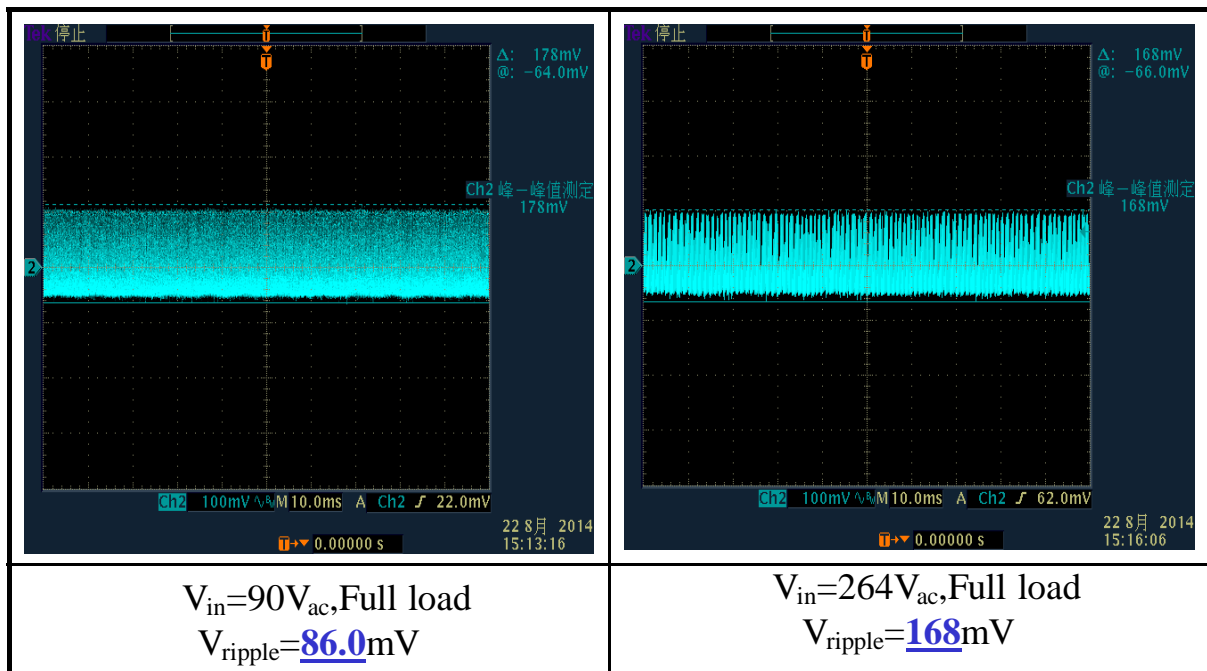
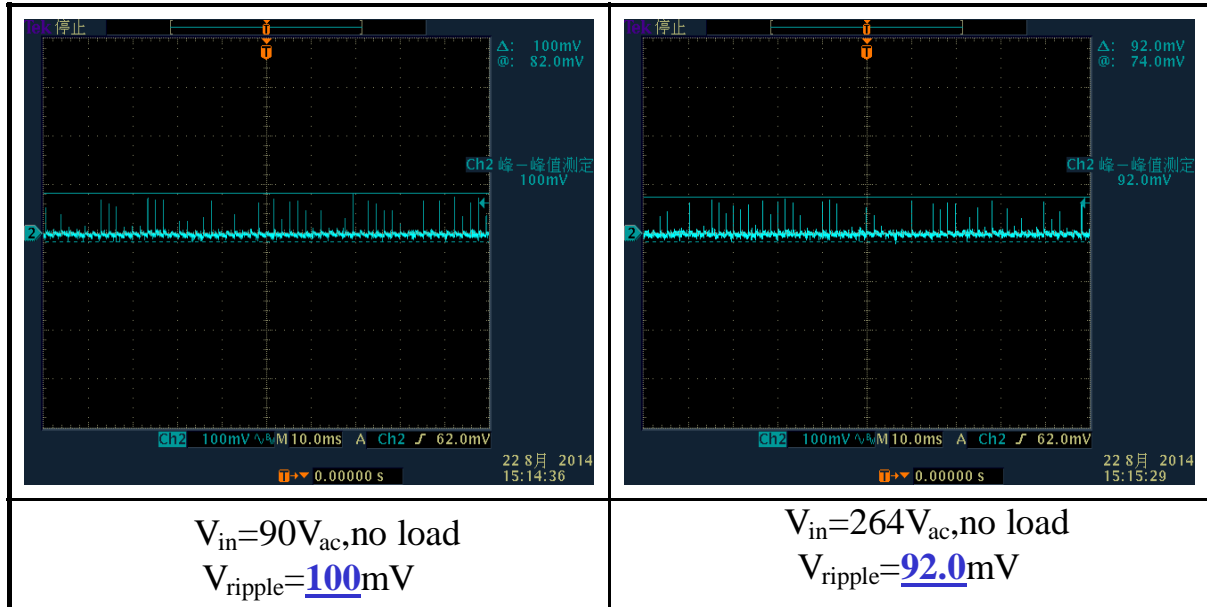


4. Time sequence test:

4-4. Falling time at turn off:



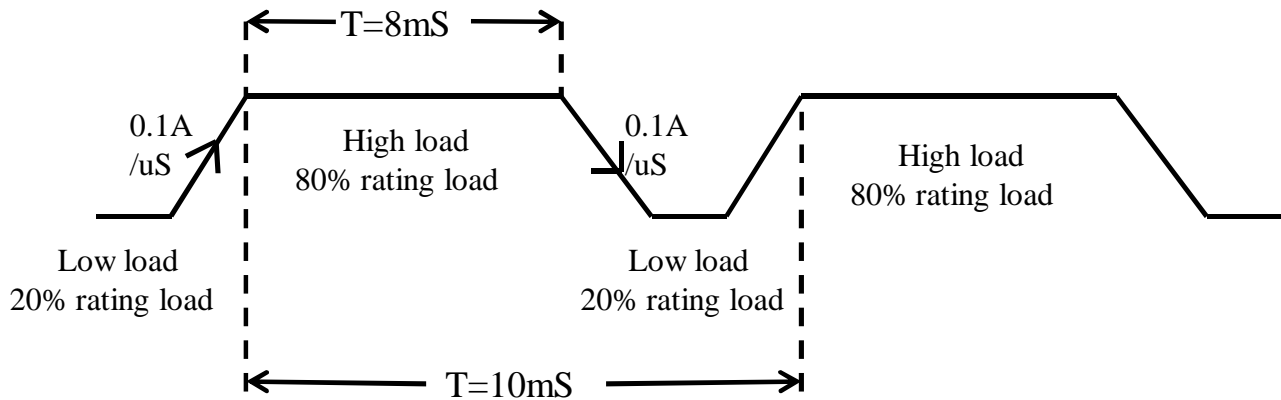
5. Output ripple&noise test:



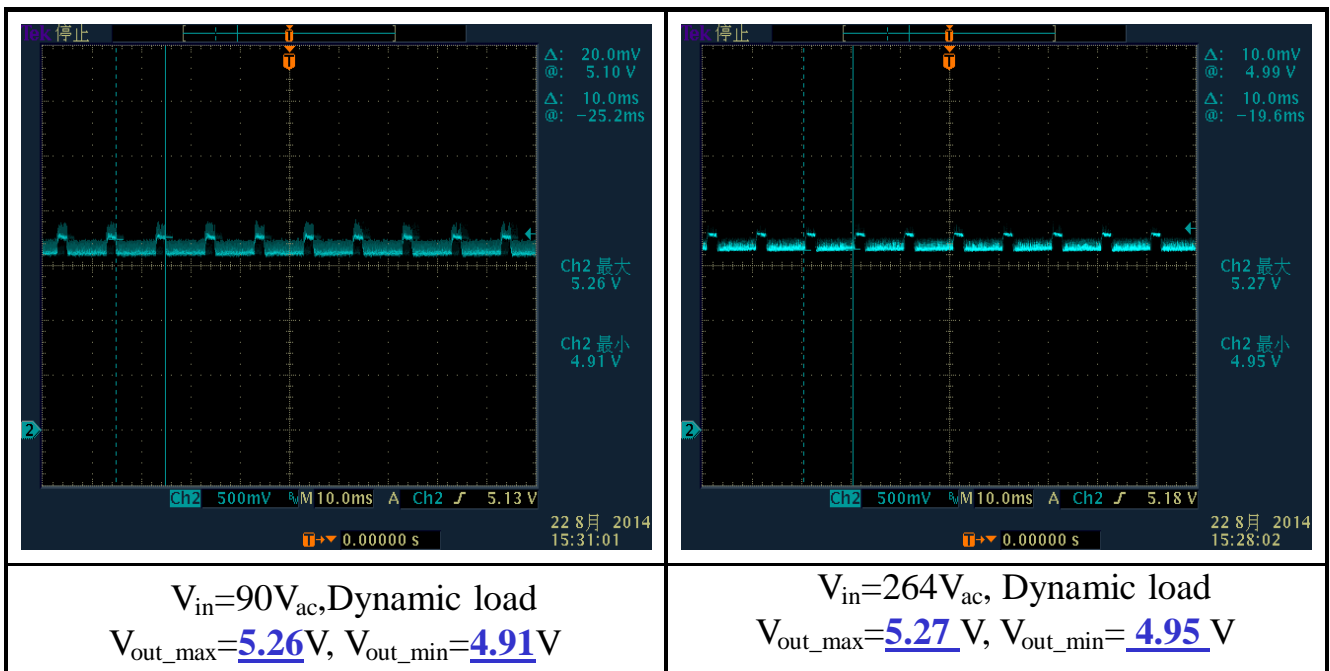
Note: Output terminal is parallel with 10uF E-cap and 0.1uF ceramic-cap.

6. Dynamic load test:

6-1. Dynamic load definition:



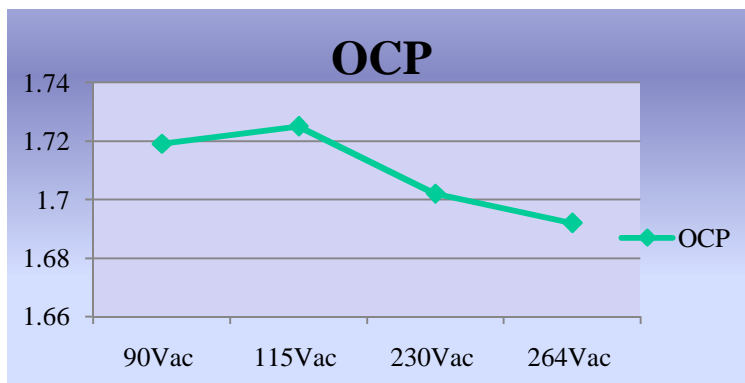
6-2. Waveform of output voltage under dynamic load



7. Protection function test:

7-1. Over current protection test:

OCP(A)	90V _{ac}	115V _{ac}	230V _{ac}	264V _{ac}
	1.719	1.725	1.702	1.692



7-2. Short circuit protection test:

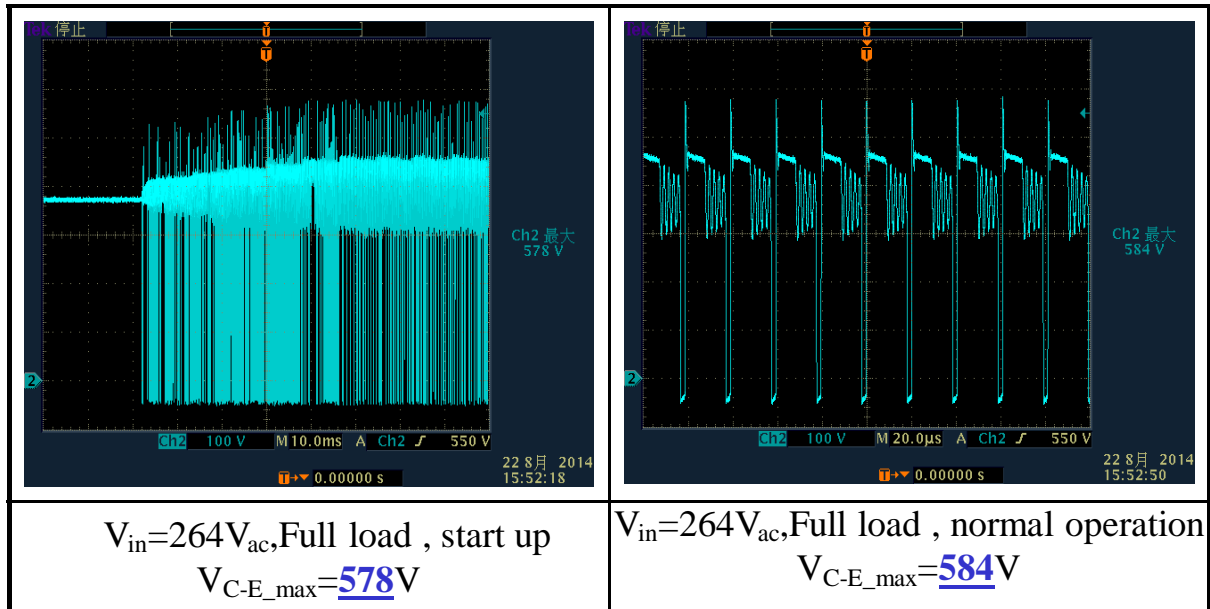
Input wattage under short output	90V _{ac}	115V _{ac}	230V _{ac}	264V _{ac}
Auto recovery /NY	Y	Y	Y	Y

7-3. Over temperature protection test:

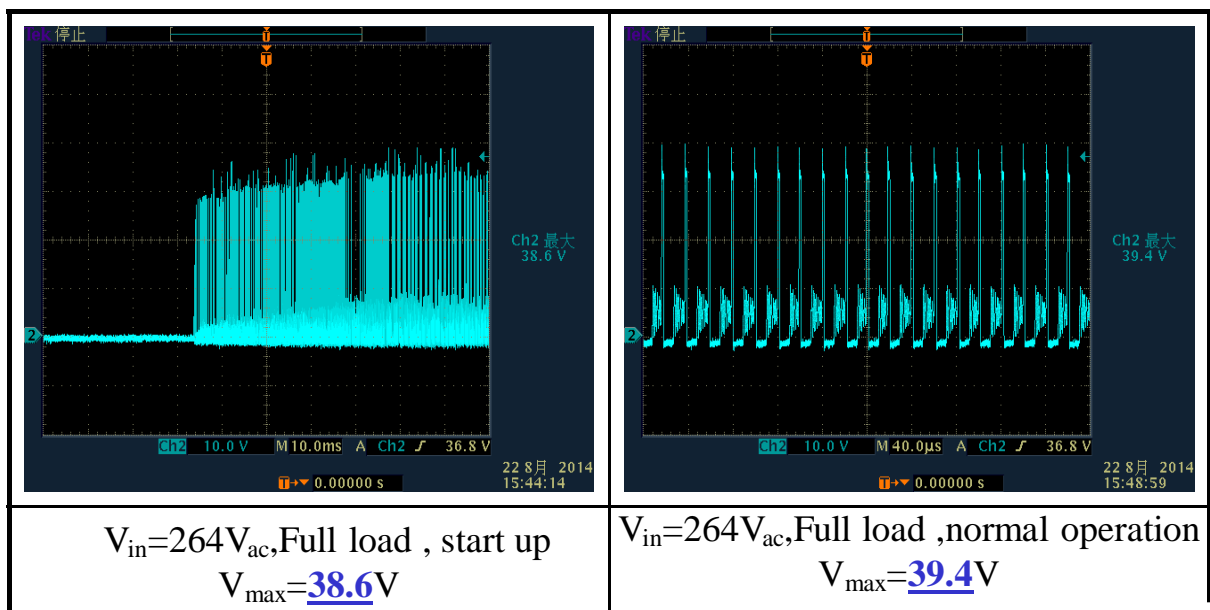
Over temperature protection point is 132 .Auto recovery Y (Y/N)

8.Key component derating test:

8-1.Switching transistor voltage stress test:

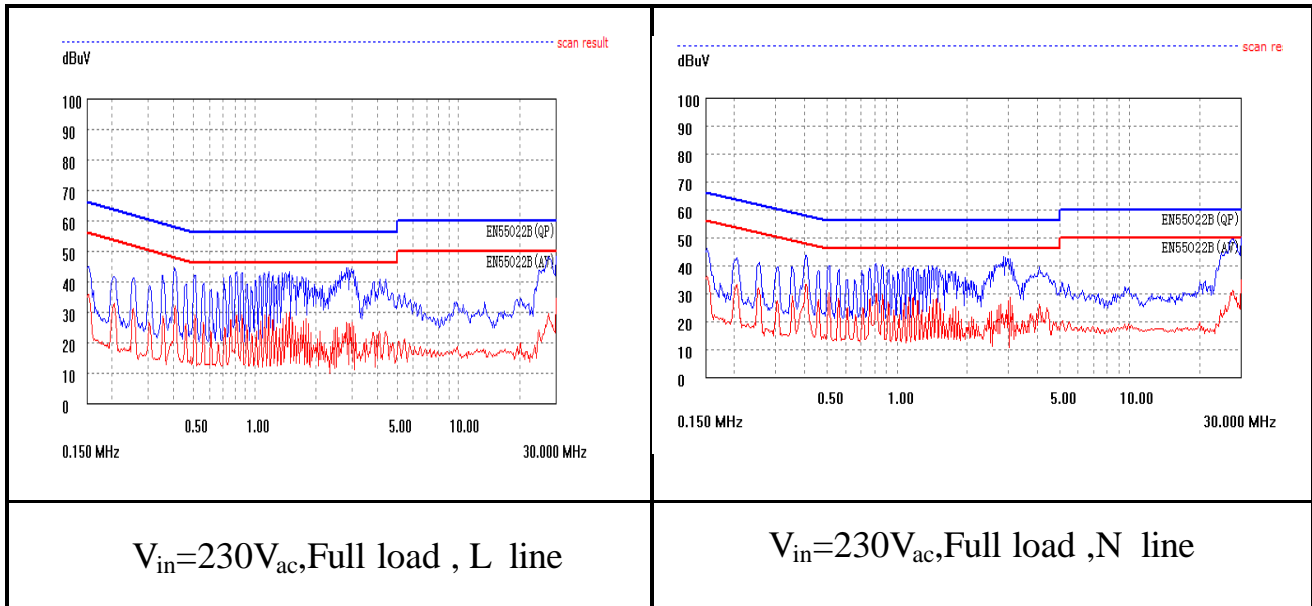


8-2.Schokky voltage stress test:



9.EMI test: performance @EN55022 class B Limited

9-1.EMI-conduction emission test:

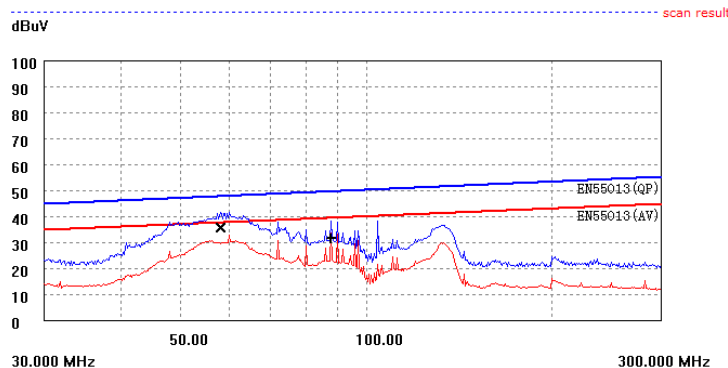


9-2. EMI-radiation emission test :

EMI TEST REPORT

Organization:	Operator:	EUT:
Place:	Time: 2014/8/22/16:7	Test equipment:KH3932
Detector: PK+AV	Test-time(ms): 30	SN: 1332408
Limit: EN55013	Transducer(PK/AV): PK / AV	JZ: 2,13,1824
Remark:		

Start(MHz)	End(MHz)	Step(MHz)
30.000	100.000	0.100
100.000	230.000	0.200
230.000	300.000	0.200

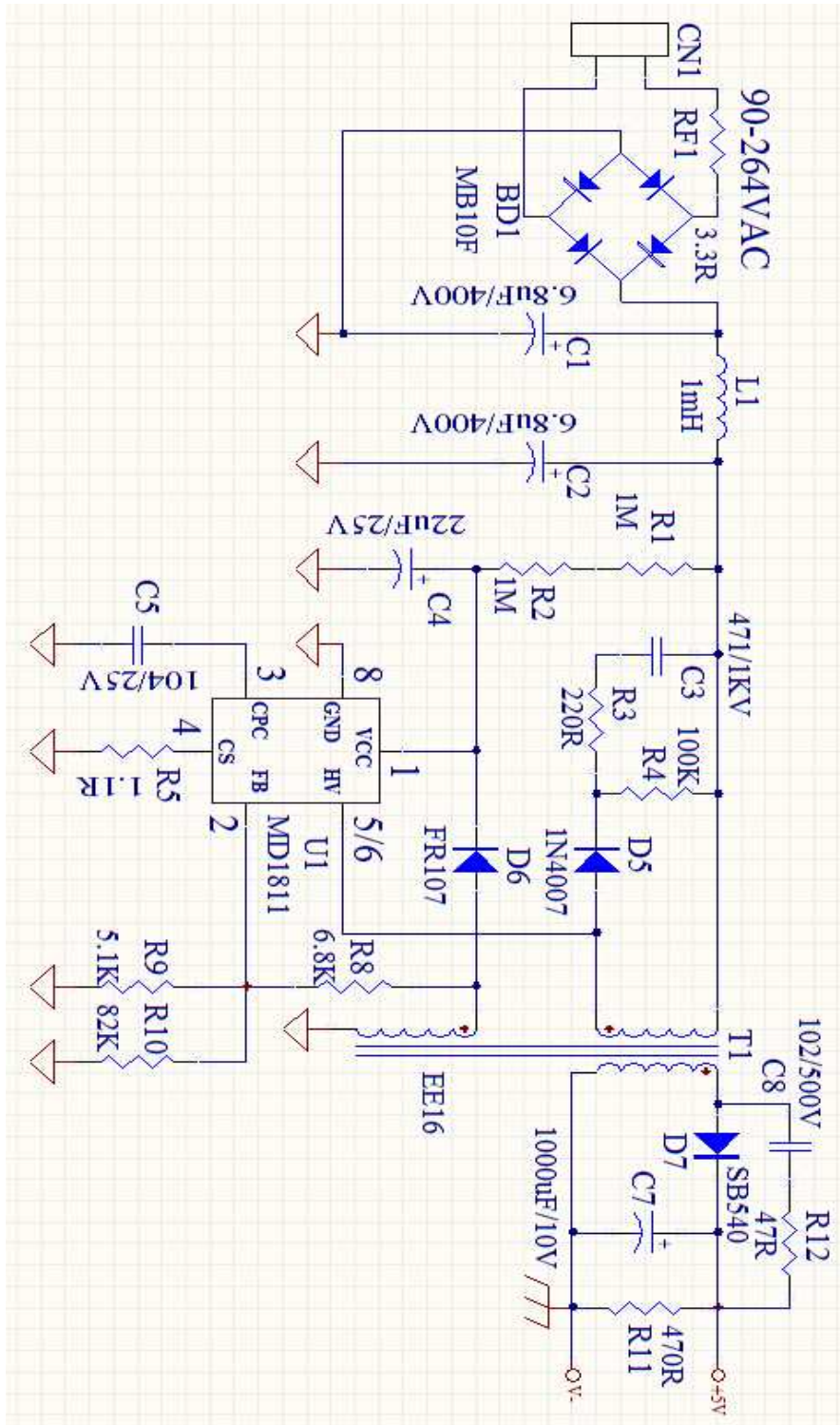


10.Key Component Temperature Rise Test:

Test Condition : Ambient Temperature Is 40 And Load Is Full Load

NO	Component	Temperature()	
		$V_{in}=90V_{ac}$	$V_{in}=264V_{ac}$
1	IC1(MD1812)	98.4	103.2
2	T1-Winding	89.0	96.3
3	T1-Core	94.2	92.1
4	BD1(Rectifier Bridge)	67.2	62.3
5	D6(1N4007,Snubber Diode)	89.2	95.8
6	D7(5A/40V,Schottky)	106.3	109.0
7			

11. Schematic:



12. Bill Of Material:

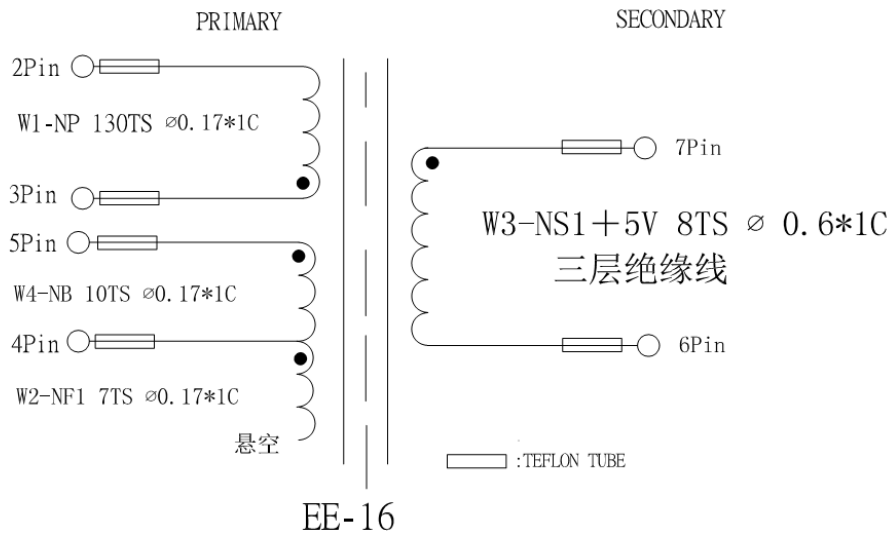
产品规格 | Input : 90~264Vac ; Output : 5V1.5A (安规产品)

初级					
No.	Q'ty	Location	Discription	Pacakge	Remark
1	2	C1 C2	6.8uF, 400V, Electrolytic 105°C	Φ8*12	
2	1	C4	22uF, 25V, Electrolytic ,Low ESR 105°C	Φ5*11	
3	1	C3	470pF, 1000V, Disc Ceramic	Rad	
4	1	D5	1N4007 1000V/1A, Rectifier	DO-41	
5	1	D6	FR107 1000V/1A, Rectifier	DO-41	
6	1	L1	Choke coil 1mH 1W	Axial	
7	1	RF1	3.3R, 1W Wire-Wound Resistor	Axial	
8	1	T1	Transformer, EE16, 5+2 pins,	EE13	
9	1	CY1	Y1 CAP 1000PF	DIP	
10	1	U1	MD1811SBG	SOIC-7	
11	1	BD1	MB10F 1000V/1A Bridge	SO-4	
12	2	R1 R2	Resistor SMD 1M 1206 5%	1206	
13	1	R3	Resistor SMD 220R 0805 5%	0805	
14	1	R4	Resistor SMD 100K 0805 5%	0805	
15	1	R5	Resistor SMD 1.2R 1206 1%	1206	
16	1	R8	Resistor SMD 6.8K 0603 1%	0603	
17	1	R9	Resistor SMD 5.1K 0603 1%	0603	
18	1	R10	Resistor SMD 82K 0603 1%	0603	
19	1	L2	Choke SMD 10uH 0805 5%	0805	
20	1	C5	Capactor SMD 104, 25V 0603 10%	0603	

次级					
No.	Q'ty	Location	Discription	Pacakge	Remark
21	1	C7	1000 uF, 10 V, Electrolytic,Low ESR, 105°C	Φ8*12	
22	1	USB	USB	DIP	
23	1	D7	SB540 40V/5A, Schottky, DO-27	DO-27	
24	1	R11	Resistor SMD 470R 0805 5%	0805	
25	1	R12	Resistor SMD 47R 0805 5%	0805	
26	1	C8	Capactor SMD 102,500V 0805 10%	0805	

13. Transformer Structure:

13-1. Schematic:



用0.2裸铜线贴着原边磁芯接到4Pin

所有绕组的绕线方向统一为1PIN到5PIN方向

NOTES:

1. 使用EE16 CORE PC40材质
2. 使用EE16 5+2Pin 卧式加长骨架, 剪去4PIN
3. 成品務必真空含浸, 鐵芯接合處點EPOXY.
4. LP: 1.35mH $\pm 7\%$

13. Transformer Structure:

13-2. Transformer winding process:

No.	绕组	线径(材质)	起绕点	端点	圈数	胶带层数	备注
1.	W1 - NP	2UE \varnothing 0.17*1C	3 Pin	2 Pin	130 TS	3 TS	密绕三层
*此绕组平滑密绕三层, 如果超出可稍微调整线径。							
2.	W2 - NF1	2UE \varnothing 0.17*1C	4 Pin	悬空	7 TS	3 TS	疏绕一层
*此绕组居中密绕。							
3.	W3 - NS	TEX-E \varnothing 0.6*1C	7 Pin	6 Pin	8 TS	3 TS	密绕一层
*此绕组疏绕一层, 不可密绕。							
4.	W4 - NB	2UE \varnothing 0.17*1C	5 Pin	4 Pin	10 TS	3 TS	居中密绕
*使用三层绝缘线。							
5.	W5 - NF3	0.2裸铜线贴着磁芯接到4Pin	4 Pin	磁芯			
*铜线需要镀锡, 紧贴着磁芯。							

13-3. Transformer Test Item:

No.	测试项目	测试条件	测试Pin脚	规格	备注
1.	INDUCTANCE (电感量)	10KHz/1V	2Pin -- 3Pin	1.35mH \pm 7%	
2.	L K (漏感)	10KHz/1V 4-5 and Sec Short	2Pin -- 3Pin	200uH Max	
3.	HI-POR 高压测试	3500Vac 5mA One Minute	Primary--Secondary	3500Vac 5mA	
		1500Vac 5mA	Primary to Core	1500Vac 5mA	
		1500Vac 5mA	Secondary to Core	1500Vac 5mA	
4.	Insulation Resistance 绝缘电阻	500Vdc	All Windings to Core	>100 Mohms	
		500Vdc	Between windings	>100 Mohms	
5.	DC Resistance DC阻抗		2Pin --3Pin	< 3 Ohms	

14. PCB LAYOUT:

